GUNS AND GRADES

An Undergraduate Research Scholars Thesis

by

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Submitted to the Undergraduate Research Scholars program at
Texas A&M University
in partial fulfillment of the requirements for the designation as an

UNDERGRADUATE RESEARCH SCHOLAR

Approved by Research Advisor: Dr. Timothy Gronberg

May 2017

Major: Economics

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ABSTRACT

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Laws protecting the right to carry a concealed handgun on college campuses have been passed in eleven states to date, March 25, 2017, and additional states are considering similar legislation. A primary intent of these laws is to allow a person to utilize his or her second amendment right to bear arms to self protect from mass shootings on college campuses. However, there may be an unintended consequence from these laws permitting guns on college campuses: has permitting college students with licensed concealed handguns on campuses created a sufficient amount of fear in the participating university administrations to create a positive shift in the average grade distributions? To phrase more simply, are professors more likely than not to provide better grades for fear of students' carrying a permitted firearm? If this is the case, does the marginal benefit of protecting the second amendment outweigh the marginal cost of grade integrity?

ACKNOWLEDGEMENTS

I want to thank my research advisor and Economics Department Head, Dr. Gronberg, for his constant wisdom, encouragement, and support throughout this whole research process. I also want to thank Dr. Jansen and Dr. Schulman for their teachings that helped inspire my desire for research and further my understanding and knowledge in economic endeavors. A big thank you also goes out to Chelsi Bass and the Texas A&M University Economics Department faculty and staff for paving the way for a wonderful experience at Texas A&M and as well in the research study. Dr. Mark Hoekstra had a significant role in my Difference-in-Difference approach to my research and taught me how to make a Difference-in-Difference model. The following Texas A&M Economics PhD students assisted me in my research by teaching me how to use STATA, the resource that I utilized to run the Difference-in-Difference models: Abigail Peralta, Adam Roberts, Chao Man, Brittany Street, Chelsea Temple, and David Pritchard, Jr. Their kind assistance greatly facilitated the process. Brittany Street and Abigail Peralta sacrificed much of their time to assist me in running the Difference-in-Difference regressions and facilitated this process for me.

This research study was made possible by Idaho State University's gracious assistance by providing the data necessary to complete my research. I would like to especially thank Vincent Miller from Idaho State University, who is in charge of the Undergraduate Institutional Research. Mr. Miller went above and beyond in providing data to make this study possible.

Additionally, I want to thank my family and friends for their constant support throughout my whole educational experience. Thank you for challenging me, encouraging me, and having faith in me. I would not be where I am or who I am without each of you.

KEY WORDS

CHL	Concealed Handgun License
CPRC	Crime Prevention Research Center
DID	Difference-in-Difference
Firearms/weapons	Handguns
GPA	Grade Point Average
ISU	Idaho State University
UT	University of Texas at Austin

INTRODUCTION

Overview

Does allowing guns on college campuses create a sufficient amount of fear in the administration to create a positive shift in the average grade distributions? Professors across the country express concern for their own safety due to the recent laws allowing students the right to carry guns on campus. At the University of Texas, according to Fox News, "three professors filed a lawsuit to block [the concealed carry on campus] law, saying it could have a chilling effect on academic freedom" (Reilly). Additionally, Fox 7 News in Austin reported that some assistant instructors and graduate students at the University of Texas have started hosting office hours at bars to avoid a possible encounter with a concealed carrying student. Bars have the 51% law, meaning weapons are not permitted, as at least 51% or more of their sales stem from alcohol. Is the fear of permitted handguns valid, or are the vociferous professors and administrators actually pursuing more limitations of the Second Amendment? According to the Texas Department of Safety in September 2000, citizens with concealed carry licenses are fourteen times *less likely* to commit a crime. They are also five times *less likely* to commit a violent crime. However, will students with legal firearms skew grades? The argument against allowing students to legally carry firearms suggests professors will be inclined to inflate students' grades in order to avoid a life-threatening encounter with a handgun-toting disaffected student.

Many disgruntled faculty in the Ohio Faculty Council, upset about the proposition of concealed carry on college campuses, have responded with the argument that "the free and open exchange of ideas is fundamental to higher education and such exchanges are facilitated by

environments that are violent-free/safe spaces" (Jaschik). They additionally argue that "individuals who legally possess handguns would significantly and negatively impact the dynamic of those discussions and the value of higher education in Ohio" (Jaschik). Ohio is not the only state that has had frustration from faculty about the concealed carry law: the University of Texas at Austin has had similar responses from faculty. According to one article, professors at UT Austin are "reconsidering how they teach their classes, debating whether they should make them less confrontational or eschew certain topics altogether" (The Harvard Crimson). Not only that, "a question coming up for many academics is whether they would be forced to give A's to undeserving students, just so they could avoid being shot" (Gullion).

The state of Idaho has had the same concerns and responses by faculty and professors. According to Inside Higher ED, a Physics professor at the University of Idaho, Ruprecht Machleidt, "estimated that 90 percent of Idaho faculty opposed the bill" (Tyson). Faculty anticipate a less safe learning environment for the students.

Where the controversy lies with this crucial matter is that no one can argue with an individual's personal fear and how he or she responds out of fear. Nevertheless, there are statistics that show that the fear should be irrelevant since, according to the Gun Facts site, "crime rates involving gun owners with carry licenses have consistently been about 0.02% of all carry permit holders since Florida's right-to-carry-law started in 1988" and all-in-all, "crime is significantly higher in states without right-to-carry laws" (Gun Facts). This is confirmed by another source, the Crime Prevention Research Center ("CPRC"), where preliminary research indicates a significantly lower crime rate for permit holders. Fear is fear though, and regardless of one's personal beliefs, one cannot deny fear's influence.

Literary Review

Preliminary research on the topic of concealed carry on college campuses revealed numerous articles discussing how the right to concealed carry on college campuses could affect universities and the classroom. However, that same research found no existing economic analysis studies on the relationship between concealed carry on campus and GPAs. To the best of my knowledge, there has not been a literary review on whether a causation or correlation exists between concealed carry on college campuses and GPAs, which makes a research study on gun rights and GPAs all the more enticing and crucial to examine.

While a study on GPAs and concealed carry on college campuses and whether or not there is a statistically significant correlation between the two does not exist, there is literature on perceptions of the college campus concealed carry law and its relationship with fear. The article suggests that "the fear of victimization of campus students and their personnel [increases] (Bartula and Bowen 1)" due to the law permitting college students with their Concealed Handgun License (CHL) to carry a gun. However, this data analysis was conducted via a survey of the perspectives of university policeman in regards to the effects of the concealed carry law on college campuses. The study I plan to perform is based on observed behavioral data rather than hypothetical data based on third party perceptions. Utility, other things equal, on college campuses has diminished due to fear and increased anxiety from the law permitting guns. Henceforth, with supporting evidence that individuals believe that fear is rising due to the law change, what this study hopes to determine is if this fear has led to unanticipated, behavioral responses that affect the integrity of the education system.

Topic Importance

With the state of unrest in our country and world, coupled by tragic shootings, this social issue concerning guns and the right to carry continues to surface. Nonetheless, academic integrity and standards shall not be compromised due to a progressively deteriorating world surrounding it. The Spanish Philosopher George Santayana stresses the importance of strong academics, as he claims, "Those who cannot remember the past are doomed to repeat it." Santayana understood that the world and the individuals that inhabit the earth are constantly reforming and responding to chaos; however, the one gem that can be left behind to future generations is education and knowledge in order to learn from past mistakes and provide for a better future.

Economic Theory's Stance

Economic theory stresses the reality of opportunity cost, suggesting that one may exude his right to the second amendment, but in this case, it may come at the cost of accurate grades. On the other hand, grades can be highly accurate, but accurate grades may come at the cost of one's right to bear arms on college campuses. Therefore, which is more important? What is the next best alternative? Economic theory of opportunity cost states that one cannot obtain all desired goals at the same time, as every action has a consequence.

Thesis

The null hypothesis to be tested is that there is no relationship between laws permitting guns on college campuses and increases in GPA. When tested, the null hypothesis will show one or two results: the first being that the statement "there is not a relationship between laws permitting guns on college campuses and an increases in GPA" rejected, suggesting that there is in fact a relationship between concealed carry on campus and higher GPAs. The other conclusion

would reveal that the statistical evidence fails to reject the hypothesis of a relationship between gun permission on college campuses and higher GPAs.

Methodology

In order to carry out this analysis testing whether or not causation exists between the right to carry on campus and GPAs, I have formulated a methodology to be a roadmap for my investigation. First, I researched the states that have passed the concealed carry on campus law; the website *Armed Campuses* provided much of the information below regarding the college campus concealed carry state laws. There are currently eleven states—with a variety of political affiliations—that have the concealed carry on campus law. The eleven states and when the carry laws were passed are as follows:

Arkansas, 2013

Colorado, 2003

Idaho, 2014

Kansas, 2015

Mississippi, 2011

Ohio, 2016

Oregon, 2015

Tennessee, 2016

Texas, 2015

Utah, 2004

Wisconsin, 2015

Colorado was the state where I initially intended to conduct the research, as Colorado paved the way for the right to concealed carry on campus in 2003. However, neither Colorado State

University nor Colorado University at Boulder would agree to provide data. Additionally, the state laws for the states that do have the right to concealed carry on campus are not similar in scope: Arkansas and Tennessee's laws only protect the professor's right to carry on campus. Mississippi requires an "Enhanced Carry Permit" in order to carry a concealed weapon on campus; none of the primary four-year Mississippi universities have enacted the right to concealed carry on campus, even if the person has the "enhanced" license. Therefore, a study would not be plausible or effective at a Mississippi school. The Kansas law can be and has been delayed up to four years. However, the Kansas law will be implemented by 2017. Ohio just recently passed the bill through legislation December 9, 2016, less than two weeks after the stabbing rampage at Ohio State's campus. According to *The Blaze*, the bill was then signed by Governor Kasich into a law December 19, 2016 and becomes effective ninety days post the signature. The state of Oregon decided that public colleges and universities are unable to prohibit weapons on the campus grounds; however, concealed carry permission in buildings on campus is up to the discretion of the university. Additionally, the Oregon Higher Education Board voted to "ban weapons in all seven state colleges and universities" (Armed Campus).

Texas universities are not permitted to ban the right to concealed carry on campus to students who have obtained their CHL. The state of Wisconsin passed a law back in 2011 permitting concealed carry on college campuses; however, there is a provision that allows prohibiting concealed carry in buildings on campus by the public or private institution. According to the *Armed Campuses'* website, "as of October 1, 2016, no private or public universities, colleges, or community colleges, permit weapons inside of buildings. No private universities permit weapons on campus grounds." Therefore, it would be impossible and unreasonable to conduct a research study at a university in Wisconsin. Idaho has the enhanced

permit policy; nevertheless, Idaho universities, unlike Mississippi universities, actually abide by the rule and allow students with the enhanced concealed carry to carry on campus.

In order to accurately test if a causation exists between guns and grades, a reliable data source that is germane to the question being researched is highly important. The state of Colorado paved the way for all of the other states by implementing the right to campus carry law in 2003. However, neither large public universities, Colorado State University and Colorado University at Boulder, permitted a research study to be conducted with their data. Additionally, marijuana became legal in the state of Colorado in 2011, which could potentially cloud the data, as marijuana use could be an additional factor that alters a student's GPA and an overall university GPA.

The next state I closely explored to study was Utah. The college carry law was implemented in 2004 in Utah; a large benefit of studying this state is due to the fact that "Utah remains the only state to have a statute specifically naming public colleges and universities as public entities that do not have the authority to ban concealed carry, and thus, all eleven public institutions in Utah allow concealed weapons on their property" (Hultin). However Utah universities would not provide crucial data needed for the research study.

I looked at the state of Mississippi; however, none of the public institutions have implemented the enhanced carry law. Therefore, students are not allowed to carry on campus. This would most likely then, not have an effect on professors' fears or students' grades.

Idaho has the enhanced permit law and, unlike Mississippi universities, abides by the laws, as it permits students with an enhanced carry permit to concealed carry. The law was passed in March of 2014 and was implemented in to the eight public institutions July 1, 2014 (*Inside HigherEd*). Therefore, I chose to do my research based on data from one state school in

the state of Idaho, as data options were limited. Additionally, The University of Idaho did not have data on GPAs on file and was unable to assist me in my research. Therefore, I collected data from Idaho State University.

The enhanced concealed carry permit is a class and permit separate from Idaho's concealed carry permit (Office of the Attorney General, State of Idaho). However, the enhanced permit is accepted in thirty-seven states, unlike the concealed carry. The enhanced permit is an eight-hour class and a test, with 100 rounds fired, whereas the concealed carry does not necessarily even have to be a class and is not tested (Idaho Firearms Classes). For example, a country sheriff can grant you the right to concealed carry if you have evidence of adequate experience with a firearm. Idaho's enhanced carry permit mirrors many states normal concealed carry permit requirements. For example, in Texas, the state requires four to six hours of a CHL course, which includes a minimum of fifty rounds with a firearm (Texas Department of Public Safety). Therefore, as the Idaho Enhanced Carry permit is not much more difficult to obtain than any other concealed carry permit, it should not disqualify conducting a research study in Idaho.

I plan to test the hypothesis on one of the primary Idaho state schools, Idaho State University. I will compare the GPAs from the years 2014 to the present with the law, and the GPAs from 2010-2013 prior to the law. I will review the standard deviation before and after the law passed to determine whether or not there was a change in slope and if there is a statistically valid change in GPAs before the law's implementation versus after implementation.

Project Challenges

There are multiple challenges in my analysis of the data. I am addressing these challenges, as they may be impactful to the results of my study. These data challenges are as follows:

1. The data to determine the precise number of concealed handgun permit holders that are between 21 - 22 years of age in Idaho versus whole population of students' ages 21 - 22 is not compiled by Idaho.
2. Idaho has the "enhanced carry permit." This law is a step above the "concealed carry." However, this law could have the same effect of causing fear for professors. One could argue that this fear might not be as prevalent in a state with the "enhanced carry permit."
3. Not every state or school agreed to comply and supply data for the research. Therefore, there could be arguments against the credibility of how I, as the researcher, chose the schools to investigate.
4. There is not enough time or resources to collect and study the effects of the GPA trends on individual courses or by professor.
5. As schools are not required to comply with data requests, undergraduates have a difficult time collecting data for research undergraduates, and many universities seem to not trust undergraduates with research projects such as this one.
6. Universities dispose of data not required by law to in order to provide room for new data and prevent potential harm if someone were to use it against them.
7. Other factors, such as natural grade inflation, could contribute to the effect in grades, making this study difficult to measure.

I aim to study the grade distribution several ways:

- GPA by course
- GPA by course with only male professors
- GPA by course with only female professors

My analysis will consist of a difference-in-difference (DID): this means that I will examine the difference in Idaho State's GPA before and after the change in law. The years prior to the law change (2010 – June 30, 2014, pre-law change) are the constant in this test, and Idaho State's GPA post the law change (July 1, 2014 - 2016) are the dependent variable that will reveal if the law change, the independent variable, affected GPA. If there is a change, I want to determine whether or not the change is statistically significant in relation to prior GPA trends.

If a change is indeed present, I anticipate that upper level courses will have a greater increase, as the law only affect students 21 and up and most students in lower level courses are not of age. Movements in GPA due to this fear of concealed carry will be more difficult to determine across larger scales due to the many other variables that could contribute to this change. Additionally, I anticipate that if there is in fact a change, women would have had a larger inflation of grades, as it has been proven that women usually are more risk averse, guided more strongly by feelings, and more likely to avoid a crisis situation than men.

This DID approach will be modeled after another study that utilized the DID method when researching the effects of concealed carry laws and violent crime. The years prior provide a natural control variable since the law was not implemented, and it keeps other variables to a minimum. Jens Ludwig's reference, "Concealed-Gun-Carrying Laws and Violent Crime: Evidence from State Panel Data," examines the effects of guns and violent crime; this DID study can be used as a model for my DID analysis of the effects of the gun law on GPAs. In my analysis, the control group is the lower level courses (100 and 200 level), ceteris paribus, assuming that all students in lower level courses are under 21 years old. This is a strong control group, given the ramifications for the study on grades and concealed carry because the students have approximately the same academic level, with the same requirements for acceptance into the

university. A study comparing different universities may not be as comparable. Additionally, the state of Idaho does not permit exceptions to the enhanced carry law, so, unlike other states, the public universities may not opt out of the law. This lack of ability to opt out helps clearly identify a cause and effect because if university could opt out of the enhanced concealed carry on campus law and failed to, then that would say a lot about the school. The "treatment," in this case, is that the law permitting CHL holders the right to carry a concealed gun on public college campuses. Finally, Idaho State's "treated group" is upper level courses post law change in 2014 through 2016 in this research study. The "treated" group does not include lower level courses because, theoretically, professors teaching lower level courses should not have the fear that student's are legally carrying a concealed weapon, as they are not of age.

While a traditional regression analysis could be run to analyze the data, the DID is a much better method to best analyze the results. This is due to the fact that a regression analysis estimates the cross section data while the DID analyzes the average difference in treated and control groups. The traditional regression or time series would have to be run several times and may not be as accurate and definitely not visually as telling as the DID, as it can establish correlation, but may not identify causation. The DID approach is a quasi-experimental technique that helps identify true causation, which is a stronger test. Another factor to consider before conducting the study is the fact that it is highly difficult to determine every factor impacting GPA, which makes finding the true causal effect tricky.

CHAPTER I

RESEARCH

Research Background

In order to determine whether or not the right to concealed carry on campus has had led to grade inflation, I conducted an empirical study, creating a DID statistical analysis utilizing STATA. The purpose of running a DID once is to compare the control group and treated group. The DID is a unique analysis in that one is able to visually compare the control group and treated group before and after treatment. The ideal DID study has parallel lines in the period before the treatment took place because the parallel lines indicate a reliable study and comparable control factors. Otherwise, it makes for null results with a weak control. Pre-trends are extremely crucial for the DID study. After the "treatment," one is able to see clearly whether or not causation is present; ideally, if indeed present, then the graph trends will deviate from parallel post-treatment.

In the post-treatment time period, Fall 2010 through Spring 2014, lower level courses are measured against upper level, assuming all things equal that students in upper level are twenty-one and up and are of age to obtain a permit to legally carry an enhanced concealed carry weapon. This also assumes that students in lower level courses are, all things considered, under-twenty-one and not able to legally obtain an enhanced concealed carry license. Therefore, pre and post treatment period, lower level courses should not have a change in trend, as the law technically does not apply to these students, and the fear should not affect professors' grading in lower level courses after the law was passed. As mentioned above, upper level courses before the law change ideally would share a common trend with the lower level courses. Post treatment, a change in trend would reveal a causal treatment effect.

Data

Before diving into the regressions, the variables tested are crucial for greater comprehension of the study. The "cons" (constant variable) is GPA for lower level (100 and 200 level) classes before the law change. The dummy variable "Upper" represents the GPA for 300 and 400 level courses. "Upper" = 1 if the course is upper level and "Upper" = 0 if the course is lower level. "Post" is the dummy variable for the time period after the law change occurred July 2014. "Post" = 1 if the time period is Fall 2014 through Fall 2016. "Post = 0 if the time period is before the law change, so in our regression that would be Fall 2010 through Spring 2014. "Post-upper" represents our "treatment" group, as it shows upper level courses, or courses with students who are of age to legally obtain a permit and carry a concealed gun on campus fall 2014 through, with the data we have to date, the fall 2016. The DID is the measurement of the difference in the upper level variable verses lower level constant in both the pre law change variable and the post law change time periods.

The coefficient or constant in the equation reveals the nature of the relationship between variables; it shows the statistical value for when the independent or treated dummy variables of upper and post are both equal to zero. The variation, therefore, is what is shown when there is an increase by one unit in the independent variables. A positive coefficient means an increase in GPA and negative means decrease in GPA. However, whether the increase is meaningfully correlated to the law change is contingent upon the p-value.

Another key piece of information to note is if the DID fails in the identifying period, or the period before "treatment," then it leads to a graph that does not track right and is less reliable.

The base regression tested is as follows:

$$Y = B0 + B1 + B2 + B3$$

Y = GPA

$B0$ = the constant (lower level courses and pre Fall 2014 semesters)

$B1$ = Upper Level Dummy Variable for courses

$B2$ = Post Period Dummy Variable for courses

$B3$=Post Period Dummy Variable *and* Upper Level Dummy Variable

$$GPA = \_cons + upper + post + upper + post\_upper$$

What the regression fails to explain or expose is how different professors could lead to different grade variation. Additionally, this study is not controlling for class or actual student age, as we are not privileged to this information. Additionally, grade inflation due to other factors and natural factors are assumed to be reflected in the time series for the lower level control courses.

CHAPTER II

RESULTS

Regression 1: Male and Female - Fall and Spring

Summary Results

Variable	Obs	Mean	Std. Dev.	Min	Max
classgpa	9,263	3.17567	.6918351	0	4

Figure 1: The summary statistics in Figure 1 reveal 9,263 observations with a mean GPA for all semesters from 2010 through 2016, observing both male and female professors, to be 3.18. Therefore, a coefficient in the regression will show the deviation from the average GPA above.

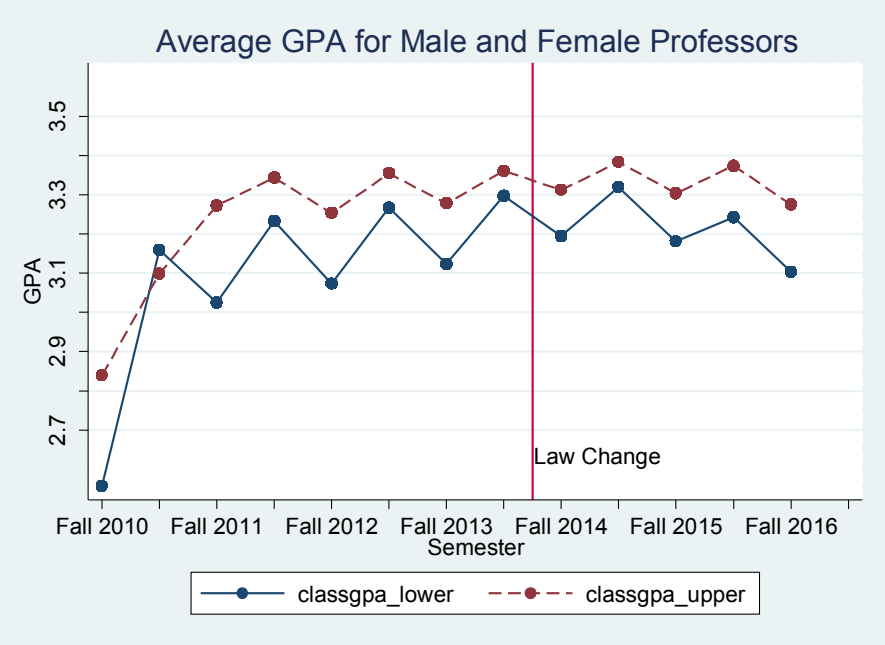
Regression Results

Table 1: Average GPA Male & Female Professors in the Fall & Spring

Independent Variable	**Class GPA**
Semester	Fall & Spring
post_upper	-0.0217
	(-0.73)
Post	0.173***
	(7.21)
Upper	0.418***
	(7.94)
_cons	3.064***
	(256.72)
N	9263

t statistics in parentheses
* p<0.05, ** p<0.01, ***p<0.001

The initial regression I ran, titled Regression 1, shown in Table 1, compares both male and female professor taught courses in both the fall and spring semesters from 2010 through 2016. The only control is the year and upper level courses. The regression revealed a Low R-squared value and a high p-value for our variable of interest. A high R-square would reveal that the model explains much of the variation in the dependent variable. Regression 1 shows a very low R-squared, meaning that the treatment shows very little fit of the model to the GPA data. A high P-value shows that Regression 1 is not statistically significant, as significance is determined by whether the value is less than 0.1, 0.05, or 0.01 or respectively at the 90%, 95%, or 99% confidence intervals. Therefore, we fail to reject the null hypothesis that the law change that allows concealed carry on Idaho State's campus has not led to a change in GPA. We are unable to establish evidence that the change in law led to a change in GPA.



Graph 1: Average GPA Male & Female Professors in the Fall & Spring

As you can see by looking at Graph 1, trends are difficult to detect, as semester grades for the fall trend consistently lower than spring semester grades. Determining whether the data is accurate in the pre-period is also troublesome. Idaho State is a smaller Public University and different courses take place in the fall and spring, which may have a large impact on the variation in average grades in the fall and spring. Therefore, I split up the semesters for a more accurate and readable study. Regressions 2 and 3 were studies of Male professor results in the fall and spring as well as Female professor grades in the fall and spring. These regressions are not explored as deeply, as we already determined that the data must be separated by fall and spring semesters.

Regression 4: Male and Female - Fall

Summary Results

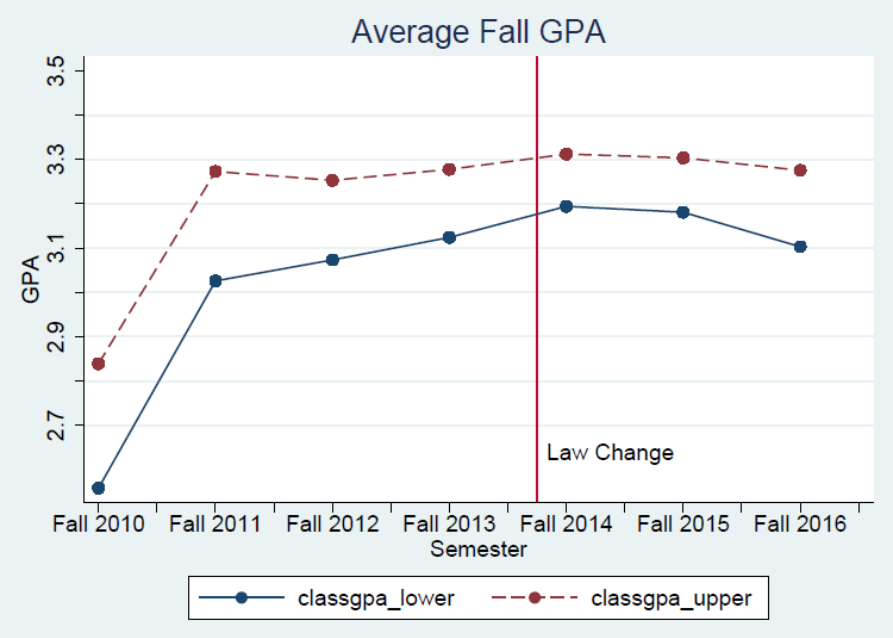
Variable	Obs	Mean	Std. Dev.	Min	Max
classgpa	5,840	3.10205	.7301704	0	4

Figure 2: The summary results for Regression 4 in Figure 2 simply show that 5,840 observations were made and explored in the time period of the fall semesters from 2010 through 2016, and the average GPA for fall courses taught by both male and female professors is 3.10. Therefore, the coefficients in the regression below will reveal if there is a deviation from the mean GPA.

Table 2: Average GPA in the Fall Semesters

Independent Variable **Semester**	**Class GPA**
post_upper	Fall
	-0.0796*
Post	(-2.03)
	0.223***
Upper	(9.25)
	0.216***
_cons	(8.39)
	2.938***
N	(186.50)
t statistics in parentheses	5840
* p<0.05, ** p<0.01, ***p<0.001	

Table 2 shows Regression 4 and is the analysis of male and female professor grades in the fall semesters. We reject the null hypothesis that concealed carry on college campuses has had no effect on grades at the 5% confidence interval. Therefore, we are 95% confident that concealed carry has a small effect on grades in this regression. GPA has dropped by 0.0796 points from the mean, 3.10, which is a very small effect and in the opposite direction anticipated.



Graph 2: Average Fall GPA for both Male and Female Professors

Regression 4, shown by Graph 2, tests the average fall GPA for both male and female taught courses. This graph is much easier to interpret than the graph that did not separate by semester, and the graph reflects a balanced panel. The trends are mostly parallel, with a slight steeper slope in the control group. However, the pre-trend is reliable enough to evaluate the results. This graph shows a decrease in grades post law implementation. This is the opposite of what was anticipated from the hypothesis and what media coverage portrays.

Regression 5: Male and Female - Spring

Summary Results:

Variable	Obs	Mean	Std. Dev.	Min	Max
classgpa	3,160	3.284516	.5953681	0	4

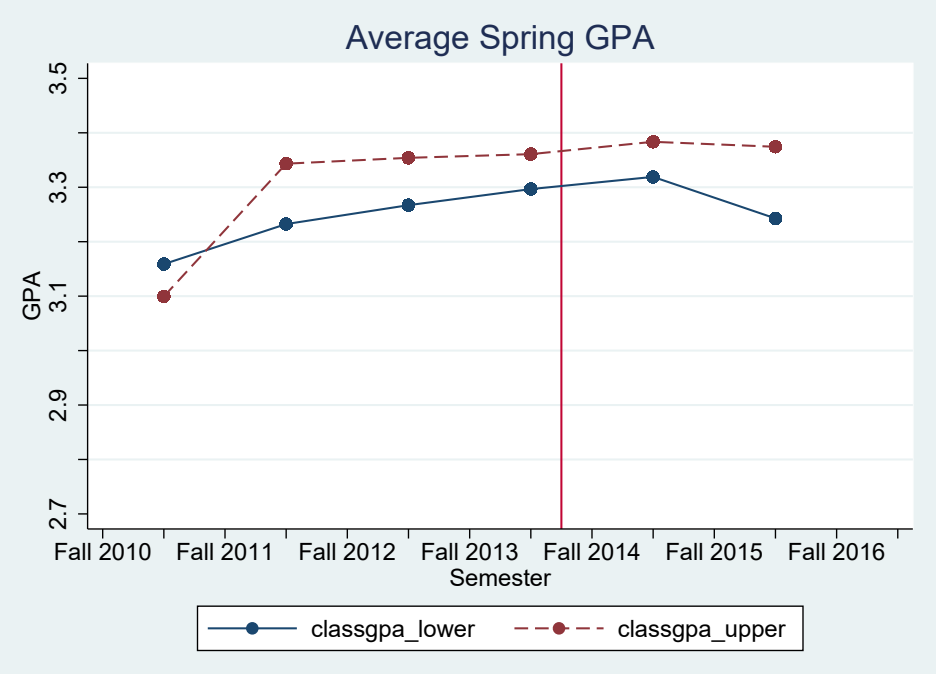
Figure 3: The summary statistics in Figure 3 show the average GPA for the spring semesters from 2010 through 2016 for both male and female professor courses. The mean GPA is 3.28. As one can see, the spring semester has a considerably higher GPA than the fall average GPA. Our regression model cannot explain why grades are higher in the spring than the fall. One could surmise that students may not study as much in the fall due to football season or perhaps, as the courses differ in the fall and spring, more difficult courses are offered in the fall. However, there should not be a difference in fear in the fall and spring semesters post law change. Additionally, professors are not likely to give higher grades in the spring and lower grades in the fall just for the heck of it.

Table 3: Average GPA in the Spring Semesters

Independent Variable	**Class GPA**
Semester	Spring
post_upper	0.0516
	(1.15)
Post	0.0414
	(1.32)
Upper	0.046
	(1.77)
_cons	3.240***
	(180.29)
N	3160

t statistics in parentheses
* p<0.05, ** p<0.01, ***p<0.001

Regression 5 in Table 3 looks at male and female professor grades in the spring semesters. The controls in this regression are lower level courses, pre-law change, and are just examining the spring semester GPAs. Unlike the fall semester, we fail to reject the null hypothesis, as the p-value is high and is not significant. Therefore, we fail to reject the null hypothesis that there is no affect.



Graph 3: Average Spring GPA for Male and Female Professors

Graph 3 showing Regression 5 appears to be roughly parallel as well. Again, the control group seems to be increasing at a slightly faster rate than the upper level courses. Therefore, the results can be trusted from this regression, as Regression 5 is not failing in the pre-trends. Results from the post period, treated group are not conclusive and we can therefore, not reject the null.

Table 4: Average GPA Regressions of Male and Female Professors

Independent Variable	**Class GPA**	**Class GPA**	**Class GPA**
Semester	Fall & Spring	Fall	Spring
post_upper	-0.0217	-0.0796*	0.0516
	(-0.73)	(-2.03)	(1.15)
Post	0.173***	0.223***	0.0414
	(7.21)	(9.25)	(1.32)
Upper	0.418***	0.216***	0.046
	(7.94)	(8.39)	(1.77)
_cons	3.064***	2.938***	3.240***
	(256.72)	(186.50)	(180.29)
N	9263	5840	3160

t statistics in parentheses
* p<0.05, ** p<0.01, ***p<0.001

In Table 4, Regression 1 looks at Male and Female Professors in the fall and spring. The second regression shown is Regression 4, examining Male and Female professors in the fall. The third regression shown explores Regression 5, which is Male and Female professors in the spring. Only Regression 4, with Male and Female professors in the fall, was significant.

What is tricky about the opposing results by semester is that I am unable to explain why the right to concealed carry on campus leads to grade inflation in the fall but not the spring for both genders. Even with opposing classes, I cannot imagine professors being affected more by the law in the fall than the spring. One semester, theoretically, should not consistently produce more "fear" than another post law change. Therefore, on the whole, we cannot reject the null hypothesis that the right to concealed carry on campus has had an effect on grades – or else this would be consistent in the fall and spring semesters.

Six more regressions were run in order to have as accurate and thorough results as possible: Regression 2 that I ran was Male Fall and Spring. Regression 3 was Female Fall and Spring. I failed to reject null on both regressions due to high p-values, and they both failed the pre-trends, which nulls results. The other four tests that I ran, Regression 6, 7, 8, and 9, respectively, are Male Fall, Female Fall, Male Spring, and Female Spring. The chart shows that we fail to reject the null hypothesis on all four regressions. We were even able to fail to reject the null that the right to concealed carry on campus did not lead to grade effects on the female spring semester. At first glance, the Female Spring regression appears to be significant at the 10% confidence interval. This would mean that we are 90% confident that the law probably had an effect on the grades of female professors in the spring. However, the 10% room for error is the highest of p-values allowed and is not as accurate as desired, which would weaken the argument. Additionally, in a two-tailed test, one cannot reject the null as the results end up being 0.102 instead of 0.51, and is greater than the 10% threshold. Therefore, the results failed to show that gender has an effect on a change in GPA post the law change, as all four regressions controlled by semester and by gender showed a failure to reject the null hypothesis.

Table 5: Average GPA

Ind. Variable **Semester** **Gender**	Class GPA Fall Male & Female	Class GPA Spring Male & Female	Class GPA Fall Male	Class GPA Fall Female	Class GPA Spring Male	Class GPA Spring Female
post_upper	-0.0566 (-1.40)	0.0122 (0.28)	-0.0857 (-1.59)	-0.0806 (-1.42)	-0.012 (-0.20)	0.129 (1.95)
Post	0.139*** (5.55)	0.134*** (4.64)	0.205*** (6.49)	0.247*** (6.73)	0.0791 (1.90)	-0.0115 (-0.24)
Upper	0.0757*** (2.99)	0.230*** (8.40)	0.0983*** (2.78)	0.342*** (9.15)	0.0273 (0.78)	0.0691 (1.81)
_cons	3.062*** (193.58)	3.067*** (169.98)	2.955*** (143.08)	2.914*** (120.83)	3.214*** (132.85)	3.276*** (123.07)
N	5166	4097	3224	2616	1806	1354

t statistics in parentheses
* p<0.05, ** p<0.01, ***p<0.001

Of the nine regressions, (the remaining regressions shown above in Table 5) only one regression had the ability to reject the null hypothesis. Even then, the grade was changing in the opposite direction anticipated. Three of nine regressions are unable to explain the pre-trends in a comprehensive manner due to an unbalanced panel with fluctuating courses in fall and spring semesters. Four regressions appear to be balanced and two (both in the spring) appear to be unbalanced in the pre-period. Therefore, the results are not conclusive and strong enough to suggest that the right to concealed carry on campus has led to grade inflation.

CONCLUSION

Based on the results from my analysis, I fail to reject the null hypothesis that the there is not a relationship between laws permitting guns on college campuses and an increase in GPA. There is not enough evidence to prove that the policy permitting handguns on college campuses and higher GPAs exists at Idaho State University. There is strong internal validity and empirical evidence at ISU. However, due to the many complications with this data, such as a small dataset, an unbalanced panel, an unreliable pre-period for several results, and a shorter time period examined than would be ideal, I recommend further study and analysis of this interesting topic and question for more external validity. Perhaps a larger dataset with a longer time period and balanced panel would provide stronger, more results. This change could vary state by state or even university by university, as every campus has a unique culture.

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